

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2009</b>
1	NAEMS: Dairy Emissions				

<b>Project Name</b>
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part I (NAEMS CA5B)
<b>Project Description</b>
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	Ag Air Research Council (AARC)	\$250,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.epa.gov/airquality/agmonitoring/techdocs.html">http://www.epa.gov/airquality/agmonitoring/techdocs.html</a>

<b>Related info 1</b>

<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2009</b>
2	Dairy Emissions				

<b>Project Name</b>
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part II (NAEMS CA5B)
<b>Project Description</b>
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	ARB	\$40,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Y. Zhao	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.epa.gov/airquality/agmonitoring/techdocs.html">http://www.epa.gov/airquality/agmonitoring/techdocs.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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3	NAEMS: Dairy Emissions				

<b>Project Name</b>
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies from California Dairies, Part III (NAEMS CA5B)
<b>Project Description</b>
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	CDFA	\$70,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Y. Zhao	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.epa.gov/airquality/agmonitoring/techdocs.html">http://www.epa.gov/airquality/agmonitoring/techdocs.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2012</b>
4	NAEMS: Dairy Emissions				

<b>Project Name</b>
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part IV (NAEMS CA5B)
<b>Project Description</b>
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	UC Davis, College of Ag and Env'al Sciences	\$40,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Y. Zhao	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.epa.gov/airquality/agmonitoring/techdocs.html">http://www.epa.gov/airquality/agmonitoring/techdocs.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2010</b>
5	Dairy Emissions				

<b>Project Name</b>
Process-Based Farm Emission Model to Estimate Air Emissions from California Dairies, contract 05-344
<b>Project Description</b>
Using biological principles and engineering studies, develop a feed/waste stream process-based dairy farm emission model for VOC emissions.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Zhang	UC Davis	ARB	\$299,191
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner	UC Davis	UC Davis	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
A. Goldstein	UC Berkeley	UC Berkeley	

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/apr/past/05-344.pdf">http://www.arb.ca.gov/research/apr/past/05-344.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>January 2007</b>
6	Dairy Emissions				

<b>Project Name</b>
Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California
<b>Project Description</b>
Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project ID 55.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$208,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
D. Goorahoo	CSU Fresno	ARB	\$104,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
B. Goodrich	CSU Fresno	SJVAPCD	\$104,000

<b>Report Location</b>
<a href="http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf">http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf</a>

<b>Related info 1</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf">http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf</a>
<b>Related info 2</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf">http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf</a>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2008</b>
7	Dairy Emissions				

<b>Project Name</b>
Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers
<b>Project Description</b>
Develop real-time methods for evaluating process and time specific emission profiles for NH <sub>3</sub> , CH <sub>4</sub> , and H <sub>2</sub> S at dairies. A program to monitor ammonia emissions using the USEPA Emission Isolation Flux Chamber began in 2006 and continued through 2008. [No updates since 2006.]

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
D. Goorahoo	CSU Fresno	CSU Agricultural Research Initiative	\$98,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Krauter	CSU Fresno	ARB	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
B. Goodrich	CSU Fresno	Boreal Laser	

<b>Report Location</b>
<a href="http://www.deq.state.or.us/aq/dairy/docs/appendix/appendix_F.pdf">http://www.deq.state.or.us/aq/dairy/docs/appendix/appendix_F.pdf</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>

<b>Related info 2</b>
Abstract on page 9 at this site: <a href="http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf">http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf</a>

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Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2009</b>
8	Dairy Emissions Mitigation				

<b>Project Name</b>
Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley (Contract No. 04-343)
<b>Project Description</b>
Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	ARB	\$250,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
D. Goorahoo	CSU Fresno	possible matching funds - CSUS Fresno Agricultural	\$250,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
B. Goodrich	CSU Fresno		

<b>Report Location</b>
Report - <a href="http://www.arb.ca.gov/research/apr/past/04-343.pdf">http://www.arb.ca.gov/research/apr/past/04-343.pdf</a> ; Abstract - <a href="http://www.arb.ca.gov/research/abstracts/04-343.htm">http://www.arb.ca.gov/research/abstracts/04-343.htm</a>

<b>Related info 1</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf">http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf</a>
<b>Related info 2</b>
Continuation of previous work

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2006</b>
9	Dairy Emissions Mitigation				

<b>Project Name</b>
Air Emission Mitigation Techniques and Technologies for California Dairies
<b>Project Description</b>
Evaluate dairy PM10, 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	Merced County via SWRCB and UC matching	\$600,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
R. Zhang	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
P. Robinson	UC Davis		

<b>Report Location</b>
<a href="http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf">http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf</a>

<b>Related info 1</b>
Project objective described in PowerPoint at: <a href="ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf">ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf</a>
<b>Related info 2</b>
SJVAPCD Aug. 2005 VOC Emission Factors for Dairies, <a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>

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[jspencer@arb.ca.gov](mailto:jspencer@arb.ca.gov)  
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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2005</b>
10	Dairy VOC Emissions				

<b>Project Name</b>
Volatile Organic Compound (VOC) Emissions from Cows Fed Typical California Rations
<b>Project Description</b>
Measurements of alcohols, volatile fatty acids, phenols, and methane (CH <sub>4</sub> ) emitted from nonlactating (dry) and lactating dairy cows and their manure under controlled conditions. The experiment was conducted in an environmental chamber that simulates commercial concrete-floored freestall cow housing conditions. The fluxes of methanol, ethanol, and CH <sub>4</sub> were measured from cows and/or their fresh manure.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	US EPA	\$75,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
B. Flocchini	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
P. Robinson	UC Davis		

<b>Report Location</b>
Not Available

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>

<b>Related info 2</b>
UCD Dairy Air Quality Symposium presentation 10-11-06 available at: <a href="http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf">http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf</a>

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11	Dairy Emissions Mitigation				

<b>Project Name</b>
Effects of Liquid Dairy Manure Aeration on Air Quality and Nutrient Cycling
<b>Project Description</b>
This project will evaluate the air and water emission mitigation effects of a wastewater treatment technology for California dairies to determine whether/to what extent aerobic treatment systems can cost-effectively reduce environmental impacts associated with manure storage.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Collar	UCCE - Kings County	UC ANR	\$30,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
J. McGarvey	USDA - ARS	UCCE	

<b>Report Location</b>
Paper is presented in the book, "Dairy Manure Management: Treatment, Handling, and Community Relations". Available for \$42 at: <a href="http://www.nraes.org/nra_order.taf?_function=detail&amp;pr_id=48&amp;_UserReference=8429860989D767704899E01F">http://www.nraes.org/nra_order.taf?_function=detail&amp;pr_id=48&amp;_UserReference=8429860989D767704899E01F</a>

<b>Related info 1</b>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	2006
12	Dairy Waste				

<b>Project Name</b>
Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality
<b>Project Description</b>
Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	USDA - ARS	\$30,300
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
R. Zhang	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
Abstract available at: <a href="http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211">http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211</a>

<b>Related info 1</b>
<b>Related info 2</b>

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13	Dairy Emissions				

<b>Project Name</b>
Estimating and Reducing Air Emissions from Dairy Feeding Operations
<b>Project Description</b>
Identify and measure VOC sources in dairy feed operations

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	USDA - CSREES	\$278,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
R. Zhang	UC Davis	USDA - ARS	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
C. Krauter	CSU Fresno	CSU Fresno	

<b>Report Location</b>
Several study presentations, see below; no final report located.

<b>Related info 1</b>
<a href="http://www.ag.iastate.edu/wastemgmt/Mitigation_Conference_proceedings/CD_proceedings/Animal_Housing-Treatment/Calvo-Freestall_housing.pdf">http://www.ag.iastate.edu/wastemgmt/Mitigation_Conference_proceedings/CD_proceedings/Animal_Housing-Treatment/Calvo-Freestall_housing.pdf</a>

<b>Related info 2</b>
<a href="http://www.airquality.nrcs.usda.gov/AAQTF/Documents/200809_201008/200905_FresnoCA/01_Zhang_AAQTF_200905.pdf">http://www.airquality.nrcs.usda.gov/AAQTF/Documents/200809_201008/200905_FresnoCA/01_Zhang_AAQTF_200905.pdf</a>

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14	Dairy Nutrient				

<b>Project Name</b>
Nutrient Balances in California Dairy Herds
<b>Project Description</b>
Data from 51 randomly selected dairy farms in Merced County, in California's Central Valley, was used to evaluate the impact of minerals in drinking water on nutrient balances and to characterize the mineral composition of manure from lactating dairy cows.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
A. Costillo	UCCE Merced	UC ANR	\$40,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
D. Bacon	UCCE Tulare		

<b>Report Location</b>
<a href="http://californiaagriculture.ucanr.org/landingpage.cfm?article=ca.v061n02p90&amp;abstract=yes">http://californiaagriculture.ucanr.org/landingpage.cfm?article=ca.v061n02p90&amp;abstract=yes</a>

<b>Related info 1</b>
<b>Related info 2</b>

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15	Dairy Emissions				

<b>Project Name</b>
Effects of Dietary Rumensin® on GHG and VOC Emissions from Lactating Dairy Cows
<b>Project Description</b>
Feed additives, like monensin sodium (monensin), have been thought to improve cattle health and productivity, and have been used for these reasons for decades. Industry is the impact the dairy industry has on the environment. A main environmental concern associated with the dairy industry is the emission of volatile organic compounds (VOC) and greenhouse gases (GHG).

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	Eli Lilly-Elanco	\$50,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
E. DePeters	USDA-ARS		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
J. MacGarvey	USDA - ARS		

<b>Report Location</b>
<a href="http://www.extension.org/pages/Environmental_Responses_to_Dietary_Monensin_in_Lactating_Dairy_Cows">http://www.extension.org/pages/Environmental_Responses_to_Dietary_Monensin_in_Lactating_Dairy_Cows</a>

<b>Related info 1</b>
Hamilton, S.W., E.J. DePeters, J.A. McGarvey, J. Lathrop, and F.M. Mitloehner. 2010. Greenhouse Gas, Animal Performance, and Bacterial Population Structure Responses to Dietary Monensin Fed to Dairy Cows. J. Environm. Qual. 39:1-9
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2010</b>
16	Dairy Air Quality				

<b>Project Name</b>
Western Region Dairy Odor and Air Quality Education
<b>Project Description</b>
The goal of this Professional Development Program grant is to reduce the environmental impacts of dairy farming in the West as a way to promote and guarantee the sustainability of the milk and cheese industries. The grant recipients plan to train agricultural professionals, selected from around the dairy producing areas of the Western region, on the best management practices available to dairy producers to mitigate the degradation of air quality. Four hands-on workshops will be conducted,

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
P. Ndegwa	WSU	USDA - SARE	\$89,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mittloehner	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
R. Sheffield	Univ. of Idaho		

<b>Report Location</b>
No report, this was an educational effort

<b>Related info 1</b>
Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717



Date: 9/14/2015

**California Air Resources Board**  
**Emission Inventory Branch**  
**Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>2010</b>
18	Steer Emissions				

<b>Project Name</b>
Volatile Organic Compound and Greenhouse Gas Emissions from Growing and Finishing Feedlot Steers and Their Waste
<b>Project Description</b>
To quantify volatile organic compounds (alcohols, volatile fatty acids, amines, and phenols) and greenhouse gas (methane, nitrous oxide, and carbon dioxide) emissions from receiving, growing and finishing feedlot steers (enteric fermentation) and fresh waste using environmental chambers at UC Davis.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	California Cattlemen Assoc.	\$169,590
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
S. Trabue	USDA - ARS	California Feeder Council	\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
		ARB/CCOS	\$10,000

<b>Report Location</b>
J Environ Qual. 2011 May-Jun;40(3):899-906. doi: 10.2134/jeq2010.0354

<b>Related info 1</b>
Costs to be split between the two funding sources
<b>Related info 2</b>
<a href="ftp://ftp.arb.ca.gov/carbis/ptsd/polcomm/011008/concon.pdf">ftp://ftp.arb.ca.gov/carbis/ptsd/polcomm/011008/concon.pdf</a>

Please provide project updates and corrections to:  
 Janet Spencer, Planning and Technical Support Division  
[jspencer@arb.ca.gov](mailto:jspencer@arb.ca.gov)  
 916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2006</b>
19	Equipment Study				

<b>Project Name</b>
UC Equipment Matching Funds Program
<b>Project Description</b>
No description, but project cited at <a href="http://animalscience.ucdavis.edu/faculty/Mitloehner/pdf/Grants.pdf">http://animalscience.ucdavis.edu/faculty/Mitloehner/pdf/Grants.pdf</a>

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	UC Davis, Chancellor for Research	\$140,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
Not Applicable

<b>Related info 1</b>
<b>Related info 2</b>

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916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>February 2009</b>
20	Covered Lagoon Emissions				

<b>Project Name</b>
Covered Lagoon Digester Emission Measurements
<b>Project Description</b>
Measurements of NH <sub>3</sub> , methane, and VOCs at dairies with CEC funded dairy digester installations. Evaluates the Dairy Power Production Program (DPPP). The DPPP was initiated to encourage the development of biologically based anaerobic digestion and gasification ("iogas") electricity generation projects on California dairies.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
P. Sousa	WURD		\$500,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
M. Summers	Summers Consulting		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.energy.ca.gov/2009publications/CEC-500-2009-009/CEC-500-2009-009.PDF">http://www.energy.ca.gov/2009publications/CEC-500-2009-009/CEC-500-2009-009.PDF</a>

<b>Related info 1</b>
<b>Related info 2</b>

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Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>July 2005</b>
22	Dairy PM, NH3 Sources				

<b>Project Name</b>
Agricultural sources of PM10 and ozone precursors
<b>Project Description</b>
Compile PM10 and NH3 emission factors. Measure concentrations of VOC relevant to to ozone formation upwind and downwind of dairies

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Flocchini	UC Davis	USDA	\$374,145
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Parnell	Texas A&M		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
R. Higashi	UC Davis		

<b>Report Location</b>
Several publications, see Related Info

<b>Related info 1</b>
<a href="http://www.reeis.usda.gov/web/crisprojectpages/192080.html">http://www.reeis.usda.gov/web/crisprojectpages/192080.html</a>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2007</b>
23	Dairy Emissions Modeling				

<b>Project Name</b>
Developing a Process Based Model for GHG for California Dairies
<b>Project Description</b>
Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	CEC PIER	\$119,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
W. Salas	Applied Geosolutions, LLC		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
R. Zhang	UC Davis		

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/2-25-10/feb10adv.pdf">http://www.arb.ca.gov/research/rsc/2-25-10/feb10adv.pdf</a>

<b>Related info 1</b>
Funded with \$500,000 total - \$119,00 for Mitloehner portion
<b>Related info 2</b>
<a href="http://www.westerndairies.org/2009symposium/Mitloehner.pdf">http://www.westerndairies.org/2009symposium/Mitloehner.pdf</a>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	2005
24	Ammonia Modeling				

<b>Project Name</b>
Development of a Process-Based Ammonia Model for Livestock Sources
<b>Project Description</b>
Develop a process-based model of ammonia emissions from five types of animal feeding operations: dairy, beef, swine, chicken, and turkey.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
G. Tonnesen	UC Riverside	LADCO	\$250,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Z. Wang	UC Riverside		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
R. Zhang	UC Davis		

<b>Report Location</b>
<a href="http://www.epa.gov/ttnchie1/conference/ei14/session1/mansell.pdf">http://www.epa.gov/ttnchie1/conference/ei14/session1/mansell.pdf</a>

<b>Related info 1</b>
Other researchers - J. Fadel, R. Zhang, G. Mansell, J. Haasbeek.
<b>Related info 2</b>
Abstract on page 9 at: <a href="http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf">http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf</a>

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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>March 2005</b>
25	Dairy Air Quality				

<b>Project Name</b>
Development of an Air Module Curriculum for the California Dairy Quality Assurance Program (CDQAP)
<b>Project Description</b>
Develop curriculum to assist producers in meeting the new air quality permit requirements

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	US EPA	\$50,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
D. Meyer	UC Davis, CDQAP		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
M. Payne	CDQAP		

<b>Report Location</b>
<a href="http://www.cdqa.org/reports/annual_report_2005.asp">http://www.cdqa.org/reports/annual_report_2005.asp</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>

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Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2005</b>
26	Dairy Emissions				

<b>Project Name</b>
Laser-based Sensors for Monitoring Ammonia Emissions
<b>Project Description</b>
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Patel	Pranalytica, Inc.	USDA - SBIR I	\$20,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf">http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf</a>

<b>Related info 1</b>
\$79,000 total; \$20,000 for Mitloehner portion
<b>Related info 2</b>
Institute of Physics Publishing, Meas. Sci. Technol. 16 (2005) 1547-1553

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717



Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2006</b>
27	Dairy Emissions				

<b>Project Name</b>
Laser-based Sensors for Monitoring Ammonia Emissions
<b>Project Description</b>
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Patel	Pranalytica, Inc.	USDA - SBIR II	\$75,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf">http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf</a>

<b>Related info 1</b>
\$350,000 (\$75,000 for Mitloehner portion)
<b>Related info 2</b>

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jspencer@arb.ca.gov  
916.324.2717

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>July 2005</b>
28	Pig Study				

<b>Project Name</b>
Effect of Atmospheric Ammonia on Pig Welfare
<b>Project Description</b>
Trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	National Pork Board	\$40,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.aasv.org/shap/issues/v15n3/v15n3p137.pdf">http://www.aasv.org/shap/issues/v15n3/v15n3p137.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	September 2011
29	Worker Exposure, Dairies				

Project Name
Respiratory Exposures and Health of Workers on California Dairies (NIOSH)
Project Description
Monitor exposures of 200 dairy workers at large dairies to dust and ammonia to define the concentrations of any airborne pollutants highly associated with respiratory problems.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	NIOSH	\$1,700,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Schenker	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bennett	UC Davis		

Report Location
<a href="http://factsreports.revues.org/492">http://factsreports.revues.org/492</a>

Related info 1
UC Davis' program - CA Dairy Environ Health Research Initiative (Cal-DEHRI)
Related info 2
Field phase in progress, June 2008

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>February 2006</b>
30	Ozone Impacts				

<b>Project Name</b>
Investigation of Atmospheric Ozone Impacts of Selected Pesticides
<b>Project Description</b>
Develop methods for estimating and quantifying ozone impacts for selected pesticide compounds for which such estimates are not currently available.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
W. Carter	UC Riverside	ARB	\$100,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
I. Malkina	UC Riverside		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
Report of Jan. 10, 2007 available at: <a href="http://www.arb.ca.gov/research/apr/past/04-334.pdf">http://www.arb.ca.gov/research/apr/past/04-334.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>August 2008</b>
31	VOC Emissions				

<b>Project Name</b>
Agricultural Pesticide VOC Sources and their Photochemical Ozone Formation Potential
<b>Project Description</b>
Improve current understanding of the photochemical O <sub>3</sub> formation potential of VOCs from agricultural pesticide applications in the San Joaquin Valley.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Flocchini	UC Davis	USDA	\$400,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
R. Higashi	UC Davis		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
M. Kleeman	UC Davis		

<b>Report Location</b>
<a href="http://www.reeis.usda.gov/web/crisprojectpages/204179.html">http://www.reeis.usda.gov/web/crisprojectpages/204179.html</a>

<b>Related info 1</b>
<a href="http://airquality.ucdavis.edu/pages/events/2008/green_acres/GREEN.pdf">http://airquality.ucdavis.edu/pages/events/2008/green_acres/GREEN.pdf</a>
<b>Related info 2</b>

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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2005
32	Pesticide Fumigation Water Seal				

Project Name
Commercialization of Intermittent Water Sealing
Project Description
Identify optimal water management strategies for water sealing commercial-scale application of fumigants.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Sullivan	Sullivan Environmental	USDA	\$78,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
H. Ajwa	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Radewald	UC Davis		

Report Location
<a href="http://www.sciencedirect.com/science/article/pii/S0045653508003913">http://www.sciencedirect.com/science/article/pii/S0045653508003913</a>

Related info 1
<a href="http://mbao.org/2005/MBAO%202005%20pdfs/Preplant/8/Sullivan.pdf">http://mbao.org/2005/MBAO%202005%20pdfs/Preplant/8/Sullivan.pdf</a>

Related info 2

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jspencer@arb.ca.gov  
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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2005</b>
33	Soil Ammonia Emissions				

<b>Project Name</b>
Improved Statewide Estimates of Ammonia Emissions from Native Soils in California
<b>Project Description</b>
Develop California specific ammonia emission factors and modeling for native soils within California

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	ARB	\$200,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Potter	NASA Ames		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
S. Klooster	CSU Monterey		

<b>Report Location</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei12/part/krauter.pdf">http://www.epa.gov/ttn/chief/conference/ei12/part/krauter.pdf</a> (2003)

<b>Related info 1</b>
<a href="http://geo.arc.nasa.gov/sge/casa/regional/california.html">http://geo.arc.nasa.gov/sge/casa/regional/california.html</a>
<b>Related info 2</b>

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Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2005</b>
34	Crop Ammonia Emissions				

<b>Project Name</b>
Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser
<b>Project Description</b>
Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$296,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
D. Goorahoo	CSU Fresno	ARB	\$148,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
B. Goodrich	CSU Fresno	Unisearch	\$148,000

<b>Report Location</b>
Partial, 2005 EPA conference. <a href="http://www.epa.gov/ttn/chief/conference/ei14/index.html">http://www.epa.gov/ttn/chief/conference/ei14/index.html</a> (search Krauter)

<b>Related info 1</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf">http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf</a>
<b>Related info 2</b>

Please provide project updates and corrections to:  
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jspencer@arb.ca.gov  
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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	Dec. 2012
35	Crop PM Emissions				

<b>Project Name</b>
Cotton Gin PM Emissions Research, contract 09-01PM
<b>Project Description</b>
Evaluate the accuracy of US EPA's sampling methods which may significantly over-estimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Whitelock	ARS - SW Cotton Ginning Research	Various cotton industry and ginners associations	\$147,500
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Buser	OK State Univ.	ARB	\$45,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
C. Boykin	Cotton Ginning Research Unit,	SJVAPCD	\$36,000

<b>Report Location</b>
See Presentations, Cotton Gin PM Study Update at: <a href="http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#">http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2011
36	Crop PM Emissions				

Project Name
Particulate Matter Emissions from Raisin Harvest
Project Description
Compare PM emissions of raisin harvesting techniques: conventional tray, continuous tray, dried on vine.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Alex Alexandrou	CSU Fresno	USDA-NRCS	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	SJVAPCD	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Ashkan	CSU Fresno		\$0

Report Location
Under review by SJVAPCD, April 2012

Related info 1
Related info 2

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	2010
37	Emissions Mitigation				

<b>Project Name</b>
Testing to Determine Emissions Reductions Achieved by Lower Emitting Agricultural Practices
<b>Project Description</b>
Evaluation of control effectiveness of two SJVAPCD Conservation Management Practices for PM (conservation tillage and combined operations)

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
US EPA RARE Study		US EPA RARE	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
		USDA	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
		SJVAPCD	

<b>Report Location</b>
Available as pdf via search terms from cfpub.eap.gov

<b>Related info 1</b>
<b>Related info 2</b>

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Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>October 2007</b>
39	Pesticide VOC Emissions				

<b>Project Name</b>
DPR Round-Robin VOC Study
<b>Project Description</b>
Determine ways to improve VOC emission estimates for solvents in pesticide formulations by comparing the emissions under field conditions to emissions seen in traditional TGA testing. Results showed more ozone production on the downwind side, but only slightly. Most of the VOC increase after spraying is NOT from the solvent being regulated but from EtOH in fuel. To decrease ozone, NOx reduction more important than VOC reduction.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
P. Green	UC Davis	USDA-CSREES	\$0
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
presentation at CDPR, date unknown: <a href="http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf">http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2009
40	Soil VOC Emissions Mitigation				

**Project Name**  
Reducing Emissions of VOCs from Agricultural Soil Fumigation, ARB contract 05-351

**Project Description**  
Original study plus extension: Develop estimates for cumulative and hourly emissions rates from laboratory, field plot and predictive models which will be compared to previous large-scale field experiments on several emission reduction strategies

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Scott Yates	UC Riverside	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Jay Gan	UC Riverside	USDA-ARS	\$100,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Majewski	UC Riverside		

**Report Location**  
<http://www.arb.ca.gov/research/apr/past/05-351.pdf>

**Related info 1**  
ARB agreement 05-351

**Related info 2**

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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	August 2001
41	Dairy & Feedlot Emissions				

Project Name
Sources and Sinks of PM10 in the San Joaquin Valley
Project Description
Evaluate on-field PM10 emissions. Evaluate PM10 and ammonia emissions for feedlots and dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
T. Cassel	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
<a href="http://www.arb.ca.gov/research/apr/reports/l2022.pdf">http://www.arb.ca.gov/research/apr/reports/l2022.pdf</a>

Related info 1
Related info 2

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2004</b>
42	Soil Ammonia Emissions				

<b>Project Name</b>
Statewide Inventory Estimates of Ammonia Emissions from Native Soils and Chemical Fertilizers in California
<b>Project Description</b>
Measure and model ammonia emissions from agricultural fertilizer application and natural soils. Report available at: <a href="ftp://ftp.arb.ca.gov/carbis/reports/l522.pdf">ftp://ftp.arb.ca.gov/carbis/reports/l522.pdf</a>

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	ARB	\$186,425
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Potter	NASA Ames	NASA Ames	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
S. Klooster	CSU Monterey		

<b>Report Location</b>
<a href="http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/00-0515Krauter2006.pdf">http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/00-0515Krauter2006.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 1996</b>
43	Dairy Emissions				

<b>Project Name</b>
Results of the Measurement of PM10 Precursor Compounds from Dairy Industry Livestock Waste
<b>Project Description</b>
Using environmental flux chambers, evaluate dairy ammonia and ROG emissions.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Schmidt	Consultant	South Coast AQMD	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf">http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf</a>

<b>Related info 1</b>
<a href="http://www.aqmd.gov/rules/proposed/pr1127.html">http://www.aqmd.gov/rules/proposed/pr1127.html</a>
<b>Related info 2</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf">http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf</a>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 1995
44	Dairy Emissions				

<b>Project Name</b>
Results of the Measurement of Volatile Organic Compounds from Livestock Wastes
<b>Project Description</b>
Evaluate process specific VOCs from dairies in the Sacramento region.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Consultant	US EPA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

<b>Report Location</b>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>

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Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>January 2002</b>
45	Dairy Emissions				

<b>Project Name</b>
Survey Current Livestock Waste Management Practices in the South Coast Air Basin
<b>Project Description</b>
Evaluate manure management practices in the SCAQMD

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.aqmd.gov/rules/support.html#r1127">http://www.aqmd.gov/rules/support.html#r1127</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>March 2003</b>
46	Dairy Emissions				

<b>Project Name</b>
Literature Survey and National Programs, Livestock Waste Management Practices Survey and Control Option Assessment
<b>Project Description</b>
Literature survey of waste management and control options. <a href="http://www.aqmd.gov/rules/proposed/pr1127.html">http://www.aqmd.gov/rules/proposed/pr1127.html</a>

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.aqmd.gov/rules/support.html">http://www.aqmd.gov/rules/support.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>March 2003</b>
47	Dairy Emissions				

<b>Project Name</b>
Identify Potential Waste Management Practices Reducing Ammonia and VOCs, Livestock Waste Management Practices Survey and Control Option Assessment
<b>Project Description</b>
Identify livestock practices to reduce emissions. <a href="http://www.aqmd.gov/rules/proposed/pr1127.html">http://www.aqmd.gov/rules/proposed/pr1127.html</a>

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://www.aqmd.gov/rules/support.html">http://www.aqmd.gov/rules/support.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2003</b>
48	Dairy Emissions				

<b>Project Name</b>
Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership
<b>Project Description</b>
Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
B. Auvermann	TAMU CEC	National Center for Manure and Animal Waste	\$12,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
W. Harman	TAMU CEC		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
D. Meyer	UC Davis		

<b>Report Location</b>
<a href="http://www.epa.gov/ttnchie1/conference/ei14/session1/sweeten_pres.pdf">http://www.epa.gov/ttnchie1/conference/ei14/session1/sweeten_pres.pdf</a>

<b>Related info 1</b>
<a href="http://ag.arizona.edu/ANS/swnmc/Proceedings/2006/Auvermann_SWNMC2006.pdf">http://ag.arizona.edu/ANS/swnmc/Proceedings/2006/Auvermann_SWNMC2006.pdf</a>
<b>Related info 2</b>
<a href="http://amarillo.tamu.edu/library/files/brent_auvermann_publications/conference_proceedings/preliminaryevaluation_18.pdf">http://amarillo.tamu.edu/library/files/brent_auvermann_publications/conference_proceedings/preliminaryevaluation_18.pdf</a>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2006</b>
49	Dairy Emissions				

<b>Project Name</b>
Evaluating Dairy Process Emissions Using Flux Chambers
<b>Project Description</b>
Using environmental flux chambers at a working dairy, evaluate relative emission levels of individual process including lagoons, flush lanes, and corrals.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Schmidt	Contractor	ARB	\$50,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
		SJVAPCD	
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
Phase II Tech Memo at: <a href="http://www.arb.ca.gov/ag/caf/SchmidtDairyTestData2005.pdf">http://www.arb.ca.gov/ag/caf/SchmidtDairyTestData2005.pdf</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf">http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf</a>

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Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2005</b>
50	Dairy Emissions				

<b>Project Name</b>
Measuring Dairy Cow Emissions in an Environmental Chamber
<b>Project Description</b>
Place cows into an environmentally controlled chamber and evaluate speciated VOC emissions emitted directly from cows and from fresh waste products.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	US EPA	\$75,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
R. Flocchini			
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
J. Peters			

<b>Report Location</b>
<a href="http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf">http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>
J Environ Qual 37:615-622 (2008)

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2006
51	Dairy Emissions				

<b>Project Name</b>
Volatile Fatty Acids, Amine, and Phenol Emissions from Cows and their Waste
<b>Project Description</b>
Compounds were measured from dry and lactating Holstein cows in an environmental chamber.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA ARS		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Koziel	ISU		

<b>Report Location</b>
<a href="http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf">http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>
<a href="http://jeq.scijournals.org/cgi/content/full/37/2/615">http://jeq.scijournals.org/cgi/content/full/37/2/615</a>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2004</b>
52	Almond Harvest Emissions				

<b>Project Name</b>
Improvement of PM10 emission factors for almond harvesting
<b>Project Description</b>
Refine existing PM10 emission factors for almond harvesting. Estimates based on measured PM10 during almond sweeping and pick up.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Flocchini	UC Davis	Almond Board of California	
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Parnell	Texas A&M		
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>

<b>Report Location</b>
<a href="http://caaques.tamu.edu/Publications/Publications/PU01107.pdf">http://caaques.tamu.edu/Publications/Publications/PU01107.pdf</a>

<b>Related info 1</b>
<a href="http://asae.frymulti.com/abstract.asp?aid=20039&amp;t=2">http://asae.frymulti.com/abstract.asp?aid=20039&amp;t=2</a>
<b>Related info 2</b>

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Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>July 2007</b>
53	Dairy Emissions				

<b>Project Name</b>
Photochemical Ozone Formation Potential of Agricultural VOC Sources
<b>Project Description</b>
Some recent estimates predict that dairy cattle are second only to on-road vehicles as a leading source of ozone precursor emissions in California's San Joaquin Valley. The objective of this work was to directly measure the ozone formation potential from dairy housing.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
P. Green		USDA	\$300,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
F. Mitloehner			
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
R. Flocchini			

<b>Report Location</b>
<a href="http://www.sciencedirect.com/science?_ob=ArticleURL&amp;_udi=B6VH3-4S0YXTM-2&amp;_user=1928924&amp;_rdoc=1&amp;_fmt=&amp;_orig=search&amp;_sort=d&amp;view=c&amp;_version=1&amp;_urlVersion=0&amp;_userid=1928924&amp;md5=e020b1203499a23d500c0127b4460438">http://www.sciencedirect.com/science?_ob=ArticleURL&amp;_udi=B6VH3-4S0YXTM-2&amp;_user=1928924&amp;_rdoc=1&amp;_fmt=&amp;_orig=search&amp;_sort=d&amp;view=c&amp;_version=1&amp;_urlVersion=0&amp;_userid=1928924&amp;md5=e020b1203499a23d500c0127b4460438</a>

<b>Related info 1</b>
presentation at CDPR, date unknown: <a href="http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf">http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf</a>
<b>Related info 2</b>
Alternate site for report: Go to <a href="http://dx.doi.org">http://dx.doi.org</a> and enter "doi:10.1016/j.atmosenv.2008.02.064"

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2005
54	Broiler Emissions				

<b>Project Name</b>
Measuring Broiler Emissions in Tunnel Ventilated Housing
<b>Project Description</b>
Emissions of PM10, ammonia and organic gasses were measured periodically during the 55 day poultry production cycle including 45 days of production and 10 days between broods.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
M. Summers	CDFA	California Poultry Federation	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Duke	Foster Farms		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

<b>Report Location</b>
<a href="http://www.arb.ca.gov/ag/caf/poulemisrpt.pdf">http://www.arb.ca.gov/ag/caf/poulemisrpt.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2005</b>
55	Dairy ROG Emissions				

<b>Project Name</b>
Evaluating Dairy Reactive Organic Gas Emissions
<b>Project Description</b>
Chemically speciate ROG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes. Further study continues in 2005-2008 (project IDs 6, 7, 8).

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
C. Krauter	CSU Fresno	ARB	\$100,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
D. Goorahoo	CSU Fresno	CSU Foundation	\$20,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
B. Goodrich	CSU Fresno		

<b>Report Location</b>
<a href="http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf">http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf</a>

<b>Related info 1</b>
<a href="http://www.4cleanair.org/Documents/APCODetermination.pdf">http://www.4cleanair.org/Documents/APCODetermination.pdf</a>
<b>Related info 2</b>
<a href="http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf">http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf</a>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>September 2008</b>
56	Dairy Waste Management				

<b>Project Name</b>
Dairy Wastewater Treatment Feasibility Study, Contract 08-279
<b>Project Description</b>
Assess the feasibility of applying standard wastewater treatment technology to the management of manure from cows in typical California dairies. EPA plans to incorporate this information into its on-going assessment of technologies for dairy manure management.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Trygve Lundquist	Cal-Poly SLO	US EPA	\$19,936
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
(When available) <a href="http://www.epa.gov/region09/ag/dairy/technologies.html">http://www.epa.gov/region09/ag/dairy/technologies.html</a>

<b>Related info 1</b>
<a href="http://www.arb.ca.gov/ag/cafdairypnl/dairypanel.htm">http://www.arb.ca.gov/ag/cafdairypnl/dairypanel.htm</a>
<b>Related info 2</b>
<a href="http://works.bepress.com/tlundqui/2/">http://works.bepress.com/tlundqui/2/</a>

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**California Air Resources Board  
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Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>June 2011</b>
57	Soil VOC Emissions Mitigation				

<b>Project Name</b>
Reducing Emissions of VOCs from Agricultural Soil Fumigation: Comparing Emission Estimates from Simplified Methodology, ARB contract 07-332
<b>Project Description</b>
For a single soil, determine the extent to which laboratory and modeling studies can simulate field emission data. Extend the range of emission reduction strategies assessable in the field using the laboratory and modeling approaches. Variables under investigation include columns/furrows, with tarped/untarped, VIF vs. HPDE covered beds/furrows.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Scott Yates	USDA-ARS-Riverside	ARB	\$100,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Daniel Ashworth	USDA-ARS	DPR	\$50,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/10-28-11/item4dfr07-332.pdf">http://www.arb.ca.gov/research/rsc/10-28-11/item4dfr07-332.pdf</a>

<b>Related info 1</b>
ARB agreement 07-332
<b>Related info 2</b>
USDA project 5310-12130-008-05

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>January 2010</b>
58	Greenwaste VOC Emissions				

<b>Project Name</b>
Emission of GHGs Resulting from Greenwaste Composting (09-01 CCOS)
<b>Project Description</b>
Construct 5 windrows, monitor oxygen, pH, ammonia, nitrate, nitrite, nitric oxide, methane, hydrogen sulfide and moisture at the core of the windrows; collect emission flux samples using a isolation flux chamber and analyze samples for methane, carbon dioxide, nitrous oxide, and IVMNEOC for 100 days

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Fatih Buyuksonmez	UC San Diego	SJVAPCD	\$198,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://valleyair.org/busind/pto/emission_factors/Criteria/Criteria/Composting/FINAL-COMPOST-STUDY-REPORT.pdf">http://valleyair.org/busind/pto/emission_factors/Criteria/Criteria/Composting/FINAL-COMPOST-STUDY-REPORT.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board**  
**Emission Inventory Branch**  
**Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>July 2010</b>
59	NAEMS: Layer Emissions				

<b>Project Name</b>
NAEMS Project: Air Emissions from California Layer Farms (NAEMS CA2B)
<b>Project Description</b>
This project is for conducting a two-year measurement and monitoring of air emissions from a layer farm in CA. The emissions from two mechanically ventilated layer houses are measured. The houses have approximately 68,000 hens in cages. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information and data are collected on ventilation, indoor and outdoor

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Zhang	UC Davis	Ag Air Research Council	\$199,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
Interim site data: <a href="http://www.epa.gov/airquality/agmonitoring/data.html">http://www.epa.gov/airquality/agmonitoring/data.html</a>

<b>Related info 1</b>
Data under review/compilation by US EPA
<b>Related info 2</b>

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 jspencer@arb.ca.gov  
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**California Air Resources Board**  
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**Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>July 2010</b>
60	NAEMS: Broiler Emissions				

<b>Project Name</b>
NAEMS Project: Air Emissions from California Broiler Farms (NAEMS CA1B)
<b>Project Description</b>
This project is for conducting a two-year measurement and monitoring of air emissions from a broiler farm in CA. The emissions from two mechanically ventilated broiler barns are measured. The two broiler barns house about 42,000 broilers in each chicken production cycle. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, methane, nitrous oxide, ethanol, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
R. Zhang	UC Davis	Ag Air Research Council	\$219,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.epa.gov/airquality/agmonitoring/techdocs.html">http://www.epa.gov/airquality/agmonitoring/techdocs.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>February 2014</b>
61	Soil NOx Emissions				

<b>Project Name</b>
Assessment of Baseline Nitrous Oxide Emissions in California Dairy Systems, Contract 09-325
<b>Project Description</b>
N2O emissions will be measured in silage corn systems of three dairy farms in Stanislaus County. The N2O flux will be measured intensively, using static chamber techniques. Annual N2O emissions will be calculated. The annual N inputs in the form of solid manure, lagoon water, and synthetic fertilizer will be accounted for to enable calculation of the fraction of applied N that was emitted as N2O, i.e., the system specific emission factor.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
William Horwath	UC Davis	ARB	\$82,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
		EDF	\$100,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
Final draft report submitted March 2013

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>February 2014</b>
62	Soil NOx Emissions				

<b>Project Name</b>
Determining NOx Emissions from Soil in California Cropping Systems to Improve Ozone Modeling, Contract 09-329
<b>Project Description</b>
This is an add-on component to the three on-going baseline nitrous oxide (N2O) monitoring efforts. The results of the study are expected to provide an estimate of NOx emissions from California's agricultural soils and ozone modeling input by including NOx emissions from the soil. See Project IDs 77, 78, 79, & 81.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
William Horwath	UC Davis	ARB	\$83,500
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
M. Burger	UC Davis		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
Description: <a href="http://www.arb.ca.gov/research/single-project.php?row_id=64853">http://www.arb.ca.gov/research/single-project.php?row_id=64853</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 2011</b>
63	Biogenic VOC Emissions				

<b>Project Name</b>
Flux Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley, Contract 06-329
<b>Project Description</b>
Develop BVOC simulation platform for central valley agricultural operations and test the modeling performance through ozone and aerosol nucleation event measurements. Micro-meteorological to landscape level emission flux measurement program for certain selected crops identified during the screening phase.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Allen Goldstein	UC Berkeley	ARB	\$400,003
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
John Karlik	UC Berkeley, Ag Extension		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/06-09-11/agenda3_contract%2006-329_dfr_ash.pdf">http://www.arb.ca.gov/research/rsc/06-09-11/agenda3_contract%2006-329_dfr_ash.pdf</a>

<b>Related info 1</b>
<a href="http://www.arb.ca.gov/research/rsc/10-28-11/oct11book.pdf">http://www.arb.ca.gov/research/rsc/10-28-11/oct11book.pdf</a>

<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
64	Biogenic VOC Emissions	In Progress	June 2013

<b>Project Name</b>
Improving Regional Biogenic VOC Emissions Estimate Using an Airborne PTR MS Eddy Flux Measurement System, contract 09-339
<b>Project Description</b>
Collect regional concentrations data for the full suite of BVOC species, develop new land cover databases, with proper scaling methodology. The results of this project would strengthen ARB BVOC inventory and improve the modeling of ozone and aerosols in ARB SIP.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Allen Goldstein	UC Berkeley	ARB	\$400,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Alex Guenther	Natl Center Atm Research		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
Halfidi Jonsson	CIRPAS		\$0

<b>Report Location</b>
<a href="http://nature.berkeley.edu/ahg/pubs/Goldstein_etal_CARB_2014.pdf">http://nature.berkeley.edu/ahg/pubs/Goldstein_etal_CARB_2014.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

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Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>December 2010</b>
65	Removing H2S from Biogas				

<b>Project Name</b>
Removal of H2S from Biogas and NOx from Engine Exhaust at a Dairy Digester Using Microwave Technology, contract #ICAT 0803
<b>Project Description</b>
The project will monitor the performance of the H2S removal system and the NOx removal system on the biogas powered engine at the Tollenaar Holsteins Dairy Farm. Anaerobic digester gas (biogas) is captured from a heated, mixed digester and used to fuel a 212 kW Guascor engine-generator. H2S is currently removed from the biogas using an aerated water bubbler system (Soloscrub).

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Mark Rawson	SMUD	SMUD	\$246,309
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Chang Cha	Cha Corporation		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
Dan Greenberg	Applied Filter Technology		\$0

<b>Report Location</b>
<a href="http://www.energy.ca.gov/2013publications/CEC-500-2013-079/CEC-500-2013-079.pdf">http://www.energy.ca.gov/2013publications/CEC-500-2013-079/CEC-500-2013-079.pdf</a>

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**California Air Resources Board  
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Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
66	Fumigant Emissions Mitigation				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Film (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Film (VIF) for 1,3-D, chloropicrin, methyl bromide

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Steve Fennimore	UC Davis	USDA-CSREES	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Husein Ajwa	UC Davis	Stawberry Commission	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
<a href="http://www.agecon.ucdavis.edu/extension/update/articles/v9n5_3.pdf">http://www.agecon.ucdavis.edu/extension/update/articles/v9n5_3.pdf</a>

Related info 1
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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2006
67	Fumigant Emissions Mitigation				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Films (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Films (VIF) for 1,3-D and Chloropicrin

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Thomas Trout	USDA-ARS		\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Gao	USDA-ARS		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
<a href="http://www.epa.gov/osp/hstl/AgCon.proceedings_print.pdf">http://www.epa.gov/osp/hstl/AgCon.proceedings_print.pdf</a>

Related info 1
Related info 2

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Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
68	Fumigant Emissions Mitigation				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impermeable Films (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impermeable Films (VIF) for 1,3-D, Chloropicrin and methyl bromide

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Husein Ajwa	UC Davis	UC Davis	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
<a href="http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=185286">http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=185286</a>

Related info 1
Related info 2

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916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
69	Fumigant Emissions Mitigation				

<b>Project Name</b>
Reductions of Fumigant Emissions using Irrigation
<b>Project Description</b>
Evaluation of reductions in fumigant emissions using tarps; focus on 1,3-D.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Husein Ajwa	UC Davis	UC Davis	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

<b>Report Location</b>
<a href="http://mbao.org/2008/035Ajwa.pdf">http://mbao.org/2008/035Ajwa.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board**  
**Emission Inventory Branch**  
**Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>May 31, 2014</b>
70	Soil Nox Emissions Modeling				

<b>Project Name</b>
Calibrating, validating, and implementing process models for CA agriculture greenhouse gas emission estimation, ARB contract #10-309
<b>Project Description</b>
Improve earlier attempts of companion projects to calibrate & validate N2O models for CA conditions and estimate N2O emissions for CA crop specific fertilizer levels, measure N2O flux and physical variables

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Changsheng Li	Univ New Hampshire	ARB	\$250,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
William Salas	Applied GeoSolutions, LLC		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/1-31-14/item11dfr10-309.pdf">http://www.arb.ca.gov/research/rsc/1-31-14/item11dfr10-309.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Draft Final Report</b>	<b>Estimated Completion Date</b>	<b>March 31, 2015</b>
71	Soil Nox Emissions Mitigation				

<b>Project Name</b>
Evaluating Mitigation Options of Nitrous Oxide Emissions in California Cropping Systems, ARB Contract No. 11-313
<b>Project Description</b>
Evaluate alternative management practices with greatest promise of reducing annual N2O emissions while maintaining productivity in lettuce, corn and tomatoes. Proposed strategies are: targeting fertilizer types and timing of their application, delaying nitrification by using urease and nitrification inhibitors, spatially decreasing the concentration of applied N fertilizer, and modifying irrigation methods.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Martin Burger	UC Davis	ARB	\$400,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>

<b>Related info 1</b>
<a href="http://www.arb.ca.gov/research/single-project.php?row_id=65096">http://www.arb.ca.gov/research/single-project.php?row_id=65096</a>
<b>Related info 2</b>
<a href="http://www.arb.ca.gov/ag/fertilizer/meetings/Proposal11-313.pdf">www.arb.ca.gov/ag/fertilizer/meetings/Proposal11-313.pdf</a>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>September 2011</b>
72	Tilling Emissions				

<b>Project Name</b>
MISTING: A Viable Conservation Management Practice For Reducing PM10 Generated by Disking
<b>Project Description</b>
Quantify and substantiate PM-reducing potential of an existing DCU misting apparatus attached to a common agricultural disk, as well as other variables such as temperature reduction of dust plume, emission factors, night farming

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Alex Alexandrou	CSU Fresno	USDA-NRCS	\$210,651
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
C. Krauter	CSU Fresno	ARI	\$420,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
S. Ashkan	CSU Fresno		\$0

<b>Report Location</b>
<a href="http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046764.pdf">http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046764.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2010
73	Almond Harvest Emissions				

Project Name
Effects of sweeping depth on particulate matter emissions from almond harvest operations
Project Description
Evaluate the effects of sweeper depth on particulate matter (PM) emissions from sweeping and pickup operations

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU		\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Capareda	TAMU		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
<a href="http://www.atmospolres.com/articles/Volume3/issue2/APR-12-024.pdf">http://www.atmospolres.com/articles/Volume3/issue2/APR-12-024.pdf</a>

Related info 1
Related info 2

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
74	Almond Harvest Emissions	Completed	2009

<b>Project Name</b>
Improving PM10 Emission Factors for Almond Sweeping and Harvesting
<b>Project Description</b>
Update almond sweeping and harvesting emission factors using dispersion modeling

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Brock Faulkner	TAMU	Almond Bd of CA	\$0
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
B. Goodrich	Trinity Consultants		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
S. Capareda	TAMU		\$0

<b>Report Location</b>
Proprietary, Almond Board of CA

<b>Related info 1</b>
<a href="http://betalab.tamu.edu/Papers/Almond/AnnualReport2010.pdf">http://betalab.tamu.edu/Papers/Almond/AnnualReport2010.pdf</a>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>2011</b>
75	Almond Harvest Emissions				

<b>Project Name</b>
Particulate matter emission factors for almond harvest as a function of harvester speed
<b>Project Description</b>
Evaluate reduction in almond harvesting PM for reducign harvester ground speed from 5 mph to 2.5 mph usign ISCST3 and AERMOD to back calculate emission rates

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Brock Faulkner	TAMU		\$0
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
B. Goodrich	Trinity Consultants		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
V. Botlaguduru	TAMU		\$0

<b>Report Location</b>
Abstract: <a href="http://www.tandfonline.com/doi/abs/10.3155/1047-3289.59.8.943">http://www.tandfonline.com/doi/abs/10.3155/1047-3289.59.8.943</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717



Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2011
76	Almond Harvest Emissions				

Project Name
Harvesting Equipment to Reduce PM Emissions from Almond Harvest Operations
Project Description
Compare emissions from new almond harvesting systems and retrofit abatement devices to emissions from a conventional harvester

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU	USDA-NRCS	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		SJVAPCD	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Not available

Related info 1
Related info 2

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>2012</b>
77	Soil NOx Emissions				

<b>Project Name</b>
Fertilizer N <sub>2</sub> O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems, ARB Contract No. 08-324)
<b>Project Description</b>
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N <sub>2</sub> O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 78, 79 & 81.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
William Horwath	UC Davis	ARB	\$300,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
		CDFA	

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf">http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf</a>

<b>Related info 1</b>
See Project ID 62, contract 09-329, which is an add-on to study nitric acid
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>2013</b>
78	Soil NOx Emissions				

<b>Project Name</b>
Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems (CEC Contract)
<b>Project Description</b>
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 79 & 81.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Johan Six			\$500,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf">http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
79	Soil NOx Emissions	In Progress	June 2013

<b>Project Name</b>
Measuring and Modeling Nitrous Oxide Emissions from California Cotton and Tomato Cropping Systems (CDFA Contract)
<b>Project Description</b>
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 81.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Dave Goorahoo			\$150,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
80	Dairy Emissions Mitigation	In Progress	2015

<b>Project Name</b>
Quantification of the Emission Reduction Benefits of Mitigation Strategies for Dairy Silage, ARB Contract No. 11-325
<b>Project Description</b>
Silage emissions include criteria pollutants (e.g. VOCs, NOx) and greenhouse gases. This project aims to quantify and model the effectiveness of various mitigation practices (such as maintaining a smooth pile face, storing silage in ag bags, etc.) on the various emissions species. Factors such as silage exposure surface area, temperature, air velocity, etc. will also be measured and analyzed.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
F. Mitloehner	UC Davis	ARB	\$400,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Y. Zhao	UC Davis		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
P. Green	UC Davis		\$0

<b>Report Location</b>

<b>Related info 1</b>
Atmospheric Environment. 2010, 44:1989-1995; Atmospheric Environment. 2010, 44: 4172-4180; J. Environ. Qual. 2011, 40:1-9, Env. Sci. & Technol. 2010, 44: 2309-2314; Trans. ASABE. 2011, 53: 1-7
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board**  
**Emission Inventory Branch**  
**Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>Dec. 31, 2015</b>
81	Soil NOx Emissions				

<b>Project Name</b>
Assessment of Baseline Nitrous Oxide Emission in Response to a Range of Nitrogen Fertilizer Application Rates in Corn Systems (CDFA Contract)
<b>Project Description</b>
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N <sub>2</sub> O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 79.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Martin Burger	UC Davis	CDFA	\$92,542
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
W. Horwath	UC Davis		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/12-0453-SA113-615FRBurgerHorwath.pdf">http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/12-0453-SA113-615FRBurgerHorwath.pdf</a>

<b>Related info 1</b>
<a href="http://www.cdfa.ca.gov/is/docs/12-0453-SABurger.pdf">www.cdfa.ca.gov/is/docs/12-0453-SABurger.pdf</a>
<b>Related info 2</b>

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 Janet Spencer, Planning and Technical Support Division  
 jspencer@arb.ca.gov  
 916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>March 2012</b>
82	Soil Nox Emissions Mitigation				

<b>Project Name</b>
Assessing practices and influencing policy to mitigate nitrous oxide (N <sub>2</sub> O) emissions from California Agriculture
<b>Project Description</b>
Evaluate N <sub>2</sub> O mitigation potential of nitrogen management practices and N use efficiencies in important CA cropping systems.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Martin Burger	UC Davis	Packard Foundation	\$350,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
W. Horwath	UC Davis		\$350,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
Not Available

<b>Related info 1</b>
<a href="http://nitrogen.ucdavis.edu/research/nitrogen/documents">http://nitrogen.ucdavis.edu/research/nitrogen/documents</a>
<b>Related info 2</b>
<a href="http://c-agg.org/cm_vault/files/docs/C-AGG_Presentation-2_29_2012_%28MFitzGibbon-ARB%29.pdf">http://c-agg.org/cm_vault/files/docs/C-AGG_Presentation-2_29_2012_%28MFitzGibbon-ARB%29.pdf</a>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
83	Soil Nox Emissions Mitigation	In Progress	June 2013

<b>Project Name</b>
Use of Walnut Biochar to improve soil properties and reduce N2O emissions
<b>Project Description</b>
Researchers are investigating the influence of biochar on the soil N cycle and carbon sequestration in a variety of crops. This study evaluates biochar from walnut shells applied to the walnut orchards as compost.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Johan Six	UC Davis	CEC	\$80,834
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
			\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
Preliminary: <a href="http://www.plantsciences.ucdavis.edu/Agroecology/Outreach/Walnut.html">http://www.plantsciences.ucdavis.edu/Agroecology/Outreach/Walnut.html</a>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717



Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	2014
84	Soil NOx Emissions				

Project Name
Compost Life Cycle Analysis
Project Description
Evaluate N2O and CH4 emissions in compost production and from applications of finished compost to almonds, tomatoes and row crops.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	CalRecycle	\$450,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Final draft report submitted April 2013

Related info 1
Related info 2

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
85	Dairy Emissions Mitigation	Draft Proposal	

<b>Project Name</b>
Development of Methodology to Assess Dairy Silage Management Practices to Reduce Emissions of Volatile Organic Compounds
<b>Project Description</b>
Develop screening methodology to assess the VOC emissions potential of silage piles. Validate the methodology with measurements at different stages from ensiling to delivery to feed lanes. Assess reductions associated with various mitigation measures.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Deeane Meyer	UC Davis	CDFA	\$219,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Peter Robinson	UC Davis	Dairy CARES	\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
Jennifer Heguy	UCCE Stanislaus County		\$0

<b>Report Location</b>

<b>Related info 1</b>
<b>Related info 2</b>

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
jspencer@arb.ca.gov  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2012
86	Dairy Nox Emissions				

Project Name
NOx emissions from a Central California dairy
Project Description
NOx and ozone were measured at a commercial dairy in Central California during 2011–12. Ambient and flux chamber measurements assessed the potential contribution of dairy feed to NOx emissions. Additional flux chamber measurements were also made using fresh silage from the dairy on the Fresno State campus.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Alam Hasson	CSU Fresno	USDA AFRI	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Shawn Ashkan	CSU Fresno	Nat'l Science Foundation	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Steven Trabue	Nat'l Lab for Ag & Environ		\$0

Report Location
Atmos. Environ. Vol. 70, 2013, pp 328-336. <a href="http://dx.doi.org/10.1016/j.atmosenv.2013.01.011">http://dx.doi.org/10.1016/j.atmosenv.2013.01.011</a>

Related info 1
Related info 2

Please provide project updates and corrections to:  
Janet Spencer, Planning and Technical Support Division  
[jspencer@arb.ca.gov](mailto:jspencer@arb.ca.gov)  
916.324.2717

Date: 9/14/2015

**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2013
87	Raisin Harvest Emissions				

<b>Project Name</b>
Air Curtain Burner Evaluation
<b>Project Description</b>
SJVAPCD demonstration project: Modify and test Burn Boss Air Curtain Burner to burn paper harvesting trays in the field. Modified unit with PTO for tractor use, portability.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Sun-maid Growers	Sun-Maid Growers		\$10,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Nisei Farmers			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Kfar Equipment Co.			\$0

<b>Report Location</b>
Not available

<b>Related info 1</b>
<a href="http://www.valleyair.org/Workshops/postings/2012/12-20-12PM25/FinalVersion/07%20Chapter%207%20Technology%20Advancement.pdf">http://www.valleyair.org/Workshops/postings/2012/12-20-12PM25/FinalVersion/07%20Chapter%207%20Technology%20Advancement.pdf</a>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
88	Reducing Groundwater Nitrates	In Progress	2015

<b>Project Name</b>
Optimizing the Use of Groundwater Nitrogen for Nut Crops
<b>Project Description</b>
Nitrate nitrogen research on advance grower practice using the "pump and fertilize" method in vulnerable groundwater areas for almond and pistachios. The research will evaluate whether the "pump and fertilize" method is effective in reducing use of nitrogen fertilizer based on the nitrates available in the ground water, and subsequently reduces nitrate levels in groundwater aquifers.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
David Smart	UC Davis	CDFA/FREP	\$473,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
Patrick Brown	UC Davis		\$0
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
Jan Hopmans	UC Davis		\$0

<b>Report Location</b>
Not available

<b>Related info 1</b>
<a href="http://www.cdfa.ca.gov/is/ffldrs/frep/index.html">http://www.cdfa.ca.gov/is/ffldrs/frep/index.html</a>
<b>Related info 2</b>

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<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Estimated Completion Date</b>
89	Soil Nox Emissions Modeling	In progress	Sept. 2016

<b>Project Name</b>
Improving DNDC Modeling Capability to Quantify Mitigation Potential of Nitrous Oxide from California Agricultural Soils
<b>Project Description</b>
This project will develop and deliver a modeling tool that will allow for the quantification of the emission reduction potentials from various N2O mitigation strategies that have been identified through previous ARB research. Previous studies have delivered to ARB a validated California-specific modeling tool based on DeNitrification-DeComposition (DNDC), incorporating largely business as usual management practices for baseline emission assessment. However, the model needs further

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Changsheng Li	Univ New Hampshire	ARB	\$112,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
William Salas	Applied GeoSolutions	Applied GeoSolutions	\$88,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>

<b>Related info 1</b>
See Project ID 70
<b>Related info 2</b>

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**California Air Resources Board  
Emission Inventory Branch  
Summary of Agricultural Emissions Research in California**

<b>Project ID</b>	<b>Project Type</b>	<b>Status</b>	<b>Completed</b>	<b>Estimated Completion Date</b>	<b>Sept. 2014</b>
90	Dairy & Feedlot PM10 Mitigation				

<b>Project Name</b>
Assessment of Control Methods for PM10 Emissions from Dairy and Feedlot Corrals
<b>Project Description</b>
Particulate matter testing at four dairies and feedlots was conducted to determine emission rates and assess the efficacy of various PM10 emission control methods. The control measures tested included: no control, sprinklers, scrape and remove, modified feed time, and scrape/remove/replace.

<b>PI 1</b>	<b>Affiliation PI 1</b>	<b>Fund Source 1</b>	<b>Amount 1</b>
Eric Winegar	Winegar Air Sciences	CDFA	\$120,000
<b>PI 2</b>	<b>Affiliation PI 2</b>	<b>Fund Source 2</b>	<b>Amount 2</b>
		SJVAPSA	\$19,000
<b>PI 3</b>	<b>Affiliation PI 3</b>	<b>Fund Source 3</b>	<b>Amount 3</b>
			\$0

<b>Report Location</b>
<a href="https://docs.google.com/file/d/0B8uymxkFP0nwemRUZTdjejFqb2c/edit?usp=drive_web&amp;pli=1">https://docs.google.com/file/d/0B8uymxkFP0nwemRUZTdjejFqb2c/edit?usp=drive_web&amp;pli=1</a>

<b>Related info 1</b>
<b>Related info 2</b>

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**California Air Resources Board  
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Project ID	Project Type	Status	Draft Proposal	Estimated Completion Date	
91	GHG Emissions				

<b>Project Name</b>
Characterize Physical and Chemical Properties of Manure in California Dairy Systems to Improve Greenhouse Gas (GHG) Emission Estimates
<b>Project Description</b>

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
	UC Davis	ARB	\$151,423
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

<b>Report Location</b>

<b>Related info 1</b>
<a href="http://www.arb.ca.gov/research/rsc/7-08-15/jul08not.pdf">http://www.arb.ca.gov/research/rsc/7-08-15/jul08not.pdf</a>
<b>Related info 2</b>

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Project ID	Project Type	Status	Draft Proposal	Estimated Completion Date	
92	GHG Emissions				

<b>Project Name</b>
Characterize California-specific Cattle Feed Rations and Improve Modeling of Enteric Fermentation for California's Greenhouse Gas (GHG) Inventory
<b>Project Description</b>

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
	UC Davis	ARB	\$99,964
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

<b>Report Location</b>

<b>Related info 1</b>
<a href="http://www.arb.ca.gov/research/rsc/7-08-15/jul08not.pdf">http://www.arb.ca.gov/research/rsc/7-08-15/jul08not.pdf</a>
<b>Related info 2</b>

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